



**TRANSMITTAL LETTER**  
**(General - Patent Pending)**

Docket No.  
9312.52

In Reply, Please Refer To: Ruben R. Lah

Application No.	Filing Date	Examiner	Customer No.	Group Art Unit	Confirmation No.
10/731,874	December 9, 2003		21,999	1764	

Title: VALVE SYSTEM AND METHOD FOR UNHEADING A COKE DRUM

COMMISSIONER FOR PATENTS:

Transmitted herewith is:

Petition to Make Special; Credit Card Form

in the above identified application.

- ☐ No additional fee is required.
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Signature

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Dated: Nov. 8, 2004

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to the "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" [37 CFR 1.8(a)] on

Nov. 8, 2004

(Date)

Signature of Person Mailing Correspondence

Michael F. Krieger

Typed or Printed Name of Person Mailing Correspondence

CC:



PATENT APPLICATION  
Docket No: 9312.52

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of		)	
	Ruben R. Lah	)	
		)	
Serial No.:	10/731,874	)	Art Unit
		)	1764
Confirmation No.:	Unknown	)	
		)	
Filed:	December 09, 2003	)	
		)	
For:	VALVE SYSTEM AND METHOD FOR	)	
	UNHEADING A COKE DRUM	)	

PETITION TO MAKE SPECIAL UNDER 37 C.F.R. § 1.102(d)

Mail Stop Petition  
Assistant Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir or Madam:

Applicants respectfully request that examination of the above-referenced patent application be advanced out of turn and that prosecution be performed in an expedited manner. Applicants believe all claims are directed to a single invention and will make an election without traverse if the Office determines that all claims are not obviously directed to a single invention. Applicants submit this written Petition to Make Special in conformance with 37 C.F.R. § 1.102(d), along with the appropriate fee as set forth in 37 C.F.R. § 1.17(h).

Applicants have caused to be made a careful and thorough pre-examination search of the prior art. This search was performed by a professional search firm under the direction of Noreen

A. Fabean. The search was conducted for United States patented art in Class 224, Subclasses 201, 257, 600 and 638. Additional prior art searches performed by attorneys at Kirton and McConkie have also been performed. A copy of each potentially relevant reference discovered in both Noreen A. Fabean's search and Kirton and McConkie's search is provided for your review.

The following is a list of references that were discovered in the above-identified pre-examination search. Each of the references will be individually discussed in greater detail below:

6,264,829	5,228,825
6,254,733	5,048,876
6,039,844	4,960,358
5,947,674	2002/0166862
5,785,843	2003/0089589

A photocopy of Form PTO-1449 submitted on April 20, 2004, citing the above-identified references has been included for the convenience of the Examiner.

#### Nature of the Present Invention

The present invention seeks to provide more efficient, cost-effective, and safe coke drum unheading devices and systems, as well as more efficient, cost-effective, and safe methods for unheading a coke drum or other similar vessel.

Some embodiments of the present invention feature a coke drum de-header system comprising: (a) a coke drum having at least one port therein, said coke drum receiving byproduct material from a manufacturing system and process; (b) a de-header valve removably coupled to the coke drum for regulating the port of the coke drum and for allowing repeated de-heading and

re-heading of the coke drum, said de-header valve comprising (1) a main body having an orifice dimensioned to align with the port of the coke drum when the de-header valve is coupled thereto; (2) a valve closure operably supported by the main body, wherein the valve closure is capable of being actuated to oscillate between an open and closed position with respect to the orifice of the de-header valve and the port of the coke drum; (3) means for supporting the valve closure; (c) a continuously maintained metal to metal contact seal between the valve closure and the means for supporting the valve closure that contributes to valve isolation, wherein the contact seal functions to shear any coke or other byproduct material that has accumulated near the port of the coke drum, thus effectively de-heading the coke drum upon actuation of the valve closure; and (d) means for actuating the valve closure.

The de-header valve is removably coupled to and seals against the flanged portion of a coke drum and over its port much the same way a conventional flange or head unit would be attached. The de-header valve is equipped with a valve closure that regulates the closing and opening of the coke drum, or rather regulates the opening and closing of the coke drum port and its associated throughput. Thus, in a closed position, the de-header valve and coke drum are prepared to receive the byproduct feed from the refinery process used to manufacture coke. As the coke drum is being filled during one stage of a decoking process, the de-header valve, and particularly the valve closure, is actuated and positioned in a closed position, wherein a seal is formed between the valve closure and the means for supporting the valve closure. Once the coke drum is filled, the valve closure is again actuated causing it to transition from a closed position to an open or semi-opened position. This opening action functions to shear any coke or other debris that accumulated on the valve closure or at or near the port of the coke drum, thus effectively de-heading the coke drum.

Shearing occurs because of the continuously maintained metal to metal contact between the valve closure and the means for supporting the valve closure. As the valve closure is caused to move, its metal surface slides about the metal surface of the means for supporting the valve closure, thus shearing the coke from and otherwise breaking its connection or attachment with the valve closure. Once the valve is opened and the coke drum de-headed, the coke may be removed from the coke drum using commonly known methods, techniques, and equipment.

The de-header valve of the present invention may comprise one of several forms or types of valves. For example, but not limiting in any way, the de-header valve comprise a valve-type selected from the group consisting of a plug valve, a ball or globe valve, a flexible wedge gate valve, a parallel slide gate valve, a solid wedge gate valve, and a sliding blind gate valve. Each of these valve-types, although functioning somewhat differently, are designed to comprise a continuously maintained metal to metal contact seal to create valve isolation and to provide the means for shearing the coke from the valve closure, thus de-heading the coke drum. As such, the coke drum de-heading system provides unique advantages over prior art or prior related de-heading systems, namely the de-heading of a coke drum without having to physically remove bulky, dangerous flange or head units.

An advantage of the present invention is its ability to provide a simple, yet effective de-heading system comprising a de-header valve having a movable valve closure that oscillates or moves back and forth about the means for supporting the valve closure to de-head a coke drum and simplify the decoking process. Another advantage of the present invention is the ability to de-head the coke drum without having to physically remove the head or flange unit, and to do so at a remote location with little or no manual requirements. Other advantages will be apparent to one skilled in the art.

In a preferred embodiment, the means for supporting the valve closure comprises a seat support system. The seat support system may comprise any arrangement or configuration of seats, depending upon the type of valve, the needs of the system, system specifications, or any other contributing factors. In one exemplary configuration, the seat support system comprises an upper and lower seat existing on either side of the valve closure, wherein the upper seat and lower seat may be independent from one another. Still further, the upper and lower seat may be comprised of either a static or dynamic nature, such that one may be static and the other dynamic, both dynamic, or both static.

In another exemplary embodiment, the seat support system comprises a single seat situated or disposed between the main body of the de-header valve and the valve closure. In this configuration, the single seat applies a continuous force to the valve closure throughout its oscillation. The single seat may be a floating or dynamic seat, or it may be a static seat, again depending upon the type of valve, the needs of the system, system specifications, or any other contributing factors.

In several embodiments, the biasing necessary to maintain bug term sealing is provided by the gate itself. Several gates are biased against the seat to provide the same contact that would occur if the seat were biased toward the gate.

In a preferred embodiment, the seat support system advantageously provides a floating seat concept to the de-header valve using at least one dynamic, live loaded seat. This floating dynamic, live loaded seat is continuously loaded against the valve closure to create a biased relationship between the seat(s) and the valve closure. The floating seat concept is accomplished using one or a combination of biasing members, such as heavy coil springs arrayed at close centers around the perimeter of the seat ring; externally live loaded and sealed seat force

applicators arrayed at quadrants around the floating seats; and/or a full perimeter flexible inconnel bellow seal spring placed between the floating seat and the seat retaining ring. A floating or dynamic seat provides many advantages, a primary one being that the seat support system and the valve closure are able to flex and distort in response to the rigorous and changing pressures and forces induced thereon during the coke manufacturing process and filling of the coke drum.

In another exemplary embodiment, means for supporting the valve closure comprises the main body itself. In this embodiment, no seats are required as various structural modifications can be made to the main body to support the valve closure. However, it is contemplated that a seat may be used to support the valve closure on one side and the main body on the other.

The continuously maintained contact seal comprises a sealing system that seals directly against the valve closure. This may be a point to point sealing system. The seal preferably consists of or is a result of the metal to metal seating between the valve closure and the means for supporting the valve closure, such as upper and lower seats. Moreover, an identifiable and calculated force is created or induced between these two components and maintained in a continuous manner as the valve closure oscillates between its open and closed positions. In one exemplary embodiment, the amount of force required to properly seal the valve closure and the means for supporting the valve closure is provided via a seat support system, wherein one or more of the seats may be a floating or dynamic seat coupled to a seat adjustment mechanism designed to control the amount of force exerted on the valve closure through or by the seat.

The present invention coke drum de-header system further comprises a steam purge system. The system utilizes pressure valves and steam purge inlet valves, as well as emergency

vent valves to monitor and control pressure within the system and to prevent inadvertent venting of the steam to atmosphere.

The present invention coke drum de-header system further comprises an internal coke containment system that provides or maintains total isolation of the coke within the system. The internal coke containment system comprises the metal to metal contact seal described herein, as well as a unique component configuration existing within the bonnets of the de-header valve.

#### Detailed Discussion of the Prior Art References in Light of the Present Invention

The prior art references are listed above and discussed in reverse chronological order below.

##### *United States Patent No. 4,960,358, to DiGiacomo, et al.*

United States Patent No. 4,960,358, issued on October 2, 1990 to DiGiacomo, et al. (“DiGiacomo”) discloses a bottom unheading device adapted for unheading vertical vessels such as coking drums. The unheading device includes an attachment to a lower flange of a coking drum, which is fastened by a plurality of swing bolts, which are disconnected by remotely operating the detentioning equipment and a frame which can lower the cover unit in a carriage which moves the frame laterally to one side. A chute attached to the frame can be raised into engagement with the coking drum’s lower flange for removal of coke from the drum. Following such coke removal the chute is lowered and the cover unit is moved laterally and remotely reconnected to the coke drum’s lower flange.

The claims of the present invention are distinguishable from the teachings of DiGiacomo, et al. Independent claim 1 of the present application claims,

[a] coke drum deheader system comprising a coke drum having at least one port therein ... a deheader valve removably coupled to said port of said coke drum for regulating the throughput of said port and for allowing repeated deheading and reheading of the coke drum said deheader valve comprising a main body having



an orifice dimensioned to a line with said port of said coke drum when said deheader valve is coupled thereto. A valve closure operably supported by said main body said valve closure capable of being actuated to oscillate between an open and closed position with respect to said orifice and said port and a means for supporting said valve closure a continuously maintained metal to metal contact seal between said valve closure and said means for supporting said valve closure and a means for actuating said valve closure.

DiGiacomo neither discloses nor suggests a main body with an orifice dimensioned to aligned with the port of said coke drum when the deheader valve is coupled thereto. DiGiacomo instead teaches a deheading frame which must be completely removed from the bottom flange of the coking drum for decoking to occur. Consequently, DiGiacomo does not anticipate nor render obvious independent claim 1 of the present invention. Because dependent claims 2-10 add further limitations to independent claim 1, DiGiacomo neither anticipates nor renders obvious claims 2-10.

Additional independent claims of the present inventions are distinguishable from the teaching of DiGiacomo. Independent claims 11, 17, 23, 29, 35, 41, 47 and 53 of the present application all contain elements not present nor suggested in the DiGiacomo. Each of the independent claims contains the following limitations:

[a] ... deheader valve comprising a main body removably coupled to a coke drum wherein said main body comprises an orifice dimensioned to a line with an opening of said coke drum ... a means for supporting said ... valve closure; and a metal to metal contact seal created between said valve closure and said means for supporting said ... valve closure said contact seal shearing any accumulated head of coke upon actuation of said valve closure from a closed position to open position thus effectively deheading said coke drum.

Because the present invention claims a main body coupled to the coke drum wherein said main body comprises an orifice dimensioned to align with the opening of said code drum the present invention claims an invention which allows for deheading of a coke drum without the steps of removing the main body and subsequently attaching a chute to the lower flange of the coke

drum. DiGiacomo does not teach a method wherein the main body of the deheader valve remains attached to the bottom of a coke drum during the entire deheading process.

Consequently, DiGiacomo does not anticipate nor render obvious any of the independent claims of the present invention. Because dependent claims 12-16, 18-22, 24-28, 30-34, 36-40, 42-46, 48-52 and 54-58 add further limitations to the present invention DiGiacomo neither anticipates nor renders obvious said dependent claims.

*United States Patent No. 5,048,876, to Wallskog*

United States Patent No. 5,048,876, issued on September 17, 1992 to Wallskog, (“Wallskog”) discloses a closure apparatus for vessels including coke drums which includes a ring member which extends around the perimeter of the pair of flanges. The ring member includes a plurality of rollers and engage the non-mating sides of the flanges and imparts a closing force thereon. The ring is rotatable between a lock position where the flanges are pressurized to an unlock position wherein the rollers align with slots extended around the periphery of one or both of the flanges whereby the flanges can be pulled apart.

The claims of the present invention are distinguishable from the teachings of Wallskog.

Independent claim 1 of the present application claims

[a] coke drum deheader system comprising a coke drum having at least one port therein ... a deheader valve removably coupled to said port of said coke drum for regulating the throughput of said port and for allowing repeated deheading and reheading of the coke drum said deheader valve comprising a main body having an orifice dimensioned to a line with said port of said coke drum when said deheader valve is coupled thereto. A valve closure operably supported by said main body said valve closure capable of being actuated to oscillate between an open and closed position with respect to said orifice and said port and a means for supporting said valve closure a continuously maintained metal to metal contact seal between said valve closure and said means for supporting said valve closure and a means for actuating said valve closure.

Wallskog neither discloses nor suggests a main body with an orifice dimensioned to align with the port of said coke drum when the deheader valve is coupled thereto. Wallskog instead teaches a deheading frame which must be completely removed from the bottom flange of the coking drum for decoking to occur. Consequently, Wallskog does not anticipate nor render obvious independent claim 1 of the present invention. Because dependent claims 2-10 add further limitations to independent claim 1, Wallskog neither anticipates nor renders obvious claims 2-10.

Additional independent claims of the present inventions are distinguishable from the teaching of Wallskog. Independent claims 11, 17, 23, 29, 35, 41, 47 and 53 of the present application all contain elements not present nor suggested in the Wallskog. Each of the independent claims contains the following limitations:

[a] ... deheader valve comprising a main body removably coupled to a coke drum wherein said main body comprises an orifice dimensioned to a line with an opening of said coke drum ... a means for supporting said ... valve closure; and a metal to metal contact seal created between said valve closure and said means for supporting said ... valve closure said contact seal shearing any accumulated head of coke upon actuation of said valve closure from a closed position to open position thus effectively deheading said coke drum.

Because the present invention claims a main body coupled to the coke drum wherein said main body comprises an orifice dimensioned to align with the opening of said coke drum the present invention claims an invention which allows for deheading of a coke drum without the steps of removing the main body and subsequently attaching a chute to the lower flange of the coke drum. Wallskog does not teach a method wherein the main body of the deheader valve remains attached to the bottom of a coke drum during the entire deheading process. Consequently, Wallskog does not anticipate nor render obvious any of the independent claims of the present invention. Because dependent claims 12-16, 18-22, 24-28, 30-34, 36-40, 42-46, 48-52 and 54-58

add further limitations to the present invention, Wallskog neither anticipates nor renders obvious said dependent claims.

*United States Patent No. 5,228,825, to Fruchtbaum, et al.*

United States Patent No.5,228,825, issued on July 20, 1993 to Fruchtbaum, et al., (“Fruchtbaum”) discloses a device and method for deheading the coke drum. The coke drum deheading device has an annular retaining element spring bias from a lower flange of a coke drum and a plurality of hooks which extend from the retaining element to engage a cradle holding the bottom head against the flange. When it is desired to disengage the head from the flange the hook retaining elements are removed by a first set of cylinders to release tension from the hooks so they can be disengaged from the bottom head. The bottom head can then be disengaged from the flange, lowered and removed laterally away from the coke drum on a hydraulic table.

The claims of the present invention are distinguishable from the teachings of Fruchtbaum. Independent claim 1 of the present application claims,

[a] coke drum deheader system comprising a coke drum having at least one port therein ... a deheader valve removably coupled to said port of said coke drum for regulating the throughput of said port and for allowing repeated deheading and reheading of the coke drum said deheader valve comprising a main body having an orifice dimensioned to a line with said port of said coke drum when said deheader valve is coupled thereto. A valve closure operably supported by said main body said valve closure capable of being actuated to oscillate between an open and closed position with respect to said orifice and said port and a means for supporting said valve closure a continuously maintained metal to metal contact seal between said valve closure and said means for supporting said valve closure and a means for actuating said valve closure.

Fruchtbaum neither discloses nor suggests a main body with an orifice dimensioned to align with the port of said coke drum when the deheader valve is coupled thereto. Fruchtbaum instead teaches a deheading frame which must be completely removed from the bottom flange of the

coking drum for decoking to occur. Consequently, the Fruchtbaum does not anticipate nor render obvious independent claim 1 of the present invention. Because dependent claims 2-10 add further limitations to independent claim 1, Fruchtbaum neither anticipates nor renders obvious claims 2-10.

Additional independent claims of the present inventions are distinguishable from the teachings of Fruchtbaum. Independent claims 11, 17, 23, 29, 35, 41, 47 and 53 of the present application all contain elements not present nor suggested in the Fruchtbaum. Each of the independent claims contains the following limitations:

[a] ... deheader valve comprising a main body removably coupled to a coke drum wherein said main body comprises an orifice dimensioned to a line with an opening of said coke drum ... a means for supporting said ... valve closure; and a metal to metal contact seal created between said valve closure and said means for supporting said ... valve closure said contact seal shearing any accumulated head of coke upon actuation of said valve closure from a closed position to open position thus effectively deheading said coke drum.

Because the present invention claims a main body coupled to the coke drum wherein said main body comprises an orifice dimensioned to align with the opening of said coke drum the present invention claims an invention which allows for deheading of a coke drum without the steps of removing the main body and subsequently attaching a chute to the lower flange of the coke drum. Fruchtbaum does not teach a method wherein the main body of the deheader valve remains attached to the bottom of a coke drum during the entire deheading process.

Consequently, Fruchtbaum does not anticipate nor render obvious any of the independent claims of the present invention. Because dependent claims 12-16, 18-22, 24-28, 30-34, 36-40, 42-46, 48-52 and 54-58 add further limitations to the present invention Fruchtbaum neither anticipates nor renders obvious said dependent claims.

Fruchtbaum neither discloses nor suggests a device or method which allows the deheading device to remain attached to the bottom flange of the coke drum during the entire deheading process like the invention claimed by the present invention. Consequently Fruchtbaum does anticipate nor render obvious independent claim 1 of the present invention.

*United States Patent No. 5,785,843, to Antalffy, et al.*

United States Patent No.5,785,843, issued on July 28, 1998 to Antalffy, et al, (“Antalffy”) discloses a coke drum head which is hinged to a coke drum body using a compound joint such as a trammel pivot and the head is moved between the opened and closed positions using an actuator and moving between open and closed positions the head traces out a noncircular path which reduces the acquired head room relative to a head using a standard pivot.

The claims of the present invention are distinguishable from the teachings of Antalffy. Independent claim 1 of the present application claims,

[a] coke drum deheader system comprising a coke drum having at least one port therein ... a deheader valve removably coupled to said port of said coke drum for regulating the throughput of said port and for allowing repeated deheading and reheading of the coke drum said deheader valve comprising a main body having an orifice dimensioned to a line with said port of said coke drum when said deheader valve is coupled thereto. A valve closure operably supported by said main body said valve closure capable of being actuated to oscillate between an open and closed position with respect to said orifice and said port and a means for supporting said valve closure a continuously maintained metal to metal contact seal between said valve closure and said means for supporting said valve closure and a means for actuating said valve closure.

Antalffy neither discloses nor suggests a main body with an orifice dimensioned to align with the port of said coke drum when the deheader valve is coupled thereto. Antalffy instead teaches a deheading frame which must be completely removed from the bottom flange of the coking drum for decoking to occur. Consequently, the Antalffy does not anticipate nor render obvious

independent claim 1 of the present invention. Because dependent claims 2-10 add further limitations to independent claim 1, Antalffy neither anticipates nor renders obvious claims 2-10.

Additional independent claims of the present inventions are distinguishable from the teaching of Antalffy. Independent claims 11, 17, 23, 29, 35, 41, 47 and 53 of the present application all contain elements not present nor suggested in the Antalffy. Each of the independent claims contains the following limitations:

[a] ... deheader valve comprising a main body removably coupled to a coke drum wherein said main body comprises an orifice dimensioned to a line with an opening of said coke drum ... a means for supporting said ... valve closure; and a metal to metal contact seal created between said valve closure and said means for supporting said ... valve closure said contact seal shearing any accumulated head of coke upon actuation of said valve closure from a closed position to open position thus effectively deheading said coke drum.

Because the present invention claims a main body coupled to the coke drum wherein said main body comprises an orifice dimensioned to align with the opening of said code drum the present invention claims an invention which allows for deheading of a coke drum without the steps of removing the main body and subsequently attaching a chute to the lower flange of the coke drum. Antalffy does not teach a method wherein the main body of the deheader valve remains attached to the bottom of a coke drum during the entire deheading process. Consequently, Antalffy does not anticipate nor render obvious any of the independent claims of the present invention. Because dependent claims 12-16, 18-22, 24-28, 30-34, 36-40, 42-46, 48-52 and 54-58 add further limitations to the present invention, Antalffy neither anticipates nor renders obvious said dependent claims.

*United States Patent No. 5,947,674, to Malsbury, et al.*

United States Patent No.5,947,674, issued on September 7, 1999 to Malsbury, et al, ("Malsbury") discloses a deheading device for removable attachment onto a lower flanged

opening of a vertically oriented vessel such as a coking drum, the unheading device being controllably supported by multiply elongated vertical extendable actuators such as hydraulic cylinders which extend between a lifting frame unit hold the head unit and the vessel support structure. The multiple vertical extendable actuators are each pivotably actuated at its lower end to the lifting frame unit, and are each pivotably attached at its upper end to a separate stationary support structure for the vessel. The unheading device is adapted for lowering the head unit and moving it laterally aside to a parking position on a platform portion of the vessel support structure then raising the lifting frame with its attached decoking chute unit to contact the vessel's lower flange opening for coke removal therefrom.

The claims of the present invention are distinguishable from the teachings of Malsbury.

Independent claim 1 of the present application claims,

[a] coke drum deheader system comprising a coke drum having at least one port therein ... a deheader valve removably coupled to said port of said coke drum for regulating the throughput of said port and for allowing repeated deheading and reheading of the coke drum said deheader valve comprising a main body having an orifice dimensioned to a line with said port of said coke drum when said deheader valve is coupled thereto. A valve closure operably supported by said main body said valve closure capable of being actuated to oscillate between an open and closed position with respect to said orifice and said port and a means for supporting said valve closure a continuously maintained metal to metal contact seal between said valve closure and said means for supporting said valve closure and a means for actuating said valve closure.

Malsbury neither discloses nor suggests a main body with an orifice dimensioned to align with the port of said coke drum when the deheader valve is coupled thereto. Malsbury instead teaches a deheading frame which must be completely removed from the bottom flange of the coking drum for decoking to occur. Consequently, the Malsbury does not anticipate nor render obvious independent claim 1 of the present invention. Because dependent claims 2-10 add further limitations to independent claim 1, Malsbury neither anticipates nor renders obvious claims 2-10.



Additional independent claims of the present inventions are distinguishable from the teaching of Malsbury. Independent claims 11, 17, 23, 29, 35, 41, 47 and 53 of the present application all contain elements not present nor suggested in Malsbury. Each of the independent claims contains the following limitations:

[a] ... deheader valve comprising a main body removably coupled to a coke drum wherein said main body comprises an orifice dimensioned to a line with an opening of said coke drum ... a means for supporting said ... valve closure; and a metal to metal contact seal created between said valve closure and said means for supporting said ... valve closure said contact seal shearing any accumulated head of coke upon actuation of said valve closure from a closed position to open position thus effectively deheading said coke drum.

Because the present invention claims a main body coupled to the coke drum wherein said main body comprises an orifice dimensioned to align with the opening of said code drum, the present invention claims an invention which allows for deheading of a coke drum without the steps of removing the main body and subsequently attaching a chute to the lower flange of the coke drum. Malsbury does not teach a method wherein the main body of the deheader valve remains attached to the bottom of a coke drum during the entire deheading process. Consequently, Malsbury does not anticipate nor render obvious any of the independent claims of the present invention. Because dependent claims 12-16, 18-22, 24-28, 30-34, 36-40, 42-46, 48-52 and 54-58 add further limitations to the present invention. Malsbury neither anticipates nor renders obvious said dependent claims.

*United States Patent No. 6,039,844, to Malik*

United States Patent No.6,039,844, issued on March 21, 2000 to Malik, ("Malik") discloses a system that reduces worker exposure during coke drum and unheading and cutting operations and it reduces risk to workers. This system employs a containment shield that safely permits drainage through the bottom head and contains water and coke avalanches.

The claims of the present invention are distinguishable from the teachings of Malik.

Independent claim 1 of the present application claims,

[a] coke drum deheader system comprising a coke drum having at least one port therein ... a deheader valve removably coupled to said port of said coke drum for regulating the throughput of said port and for allowing repeated deheading and reheading of the coke drum said deheader valve comprising a main body having an orifice dimensioned to a line with said port of said coke drum when said deheader valve is coupled thereto. A valve closure operably supported by said main body said valve closure capable of being actuated to oscillate between an open and closed position with respect to said orifice and said port and a means for supporting said valve closure a continuously maintained metal to metal contact seal between said valve closure and said means for supporting said valve closure and a means for actuating said valve closure.

Malik neither discloses nor suggests a main body with an orifice dimensioned to align with the port of said coke drum when the deheader valve is coupled thereto. Malik instead teaches a deheading frame which must be completely removed from the bottom flange of the coking drum for decoking to occur. Consequently, Malik does not anticipate nor render obvious independent claim 1 of the present invention. Because dependent claims 2-10 add further limitations to independent claim 1, Malik neither anticipates nor renders obvious claims 2-10.

Additional independent claims of the present inventions are distinguishable from the teaching of Malik. Independent claims 11, 17, 23, 29, 35, 41, 47 and 53 of the present application all contain elements not present nor suggested in the Malik. Each of the independent claims contain the following limitations:

[a] ... deheader valve comprising a main body removably coupled to a coke drum wherein said main body comprises an orifice dimensioned to a line with an opening of said coke drum ... a means for supporting said ... valve closure; and a metal to metal contact seal created between said valve closure and said means for supporting said ... valve closure said contact seal shearing any accumulated head of coke upon actuation of said valve closure from a closed position to open position thus effectively deheading said coke drum.

Because the present invention claims a main body coupled to the coke drum wherein said main body comprises an orifice dimensioned to align with the opening of said coke drum, the present invention claims an invention which allows for deheading of a coke drum without the steps of removing the main body and subsequently attaching a chute to the lower flange of the coke drum. Malik does not disclose nor suggest a coke drum deheader system which has a deheader valve comprising a main body having an orifice dimensioned to align with said port said coke drum when said deheader valve is coupled thereto. Malik does not teach a method wherein the main body of the deheader valve remains attached to the bottom of a coke drum during the entire deheading process. Consequently, Malik does not anticipate nor render obvious any of the independent claims of the present invention. Because dependent claims 12-16, 18-22, 24-28, 30-34, 36-40, 42-46, 48-52 and 54-58 add further limitations to the present invention, Malik neither anticipates nor renders obvious said dependent claims.

*United States Patent No. 6,254,733, to Lu, et al.*

United States Patent No.6,254,733, issued July 3, 2001 to Lu, et al., ("Lu") discloses a system for automatically removing the cover of a chute beneath a coke drum. The system operates in conjunction with a remotely operable coke deheading device so the chute cover is removed when the coke is deheaded. Also disclosed is a method for facilitating coke removal from a coke drum into a coke chute where the coke cover is automatically removed upon activation of the coke drum deheading device.

The claims of the present invention are distinguishable from the teachings of Lu.

Independent claim 1 of the present application claims,

[a] coke drum deheader system comprising a coke drum having at least one port therein ... a deheader valve removably coupled to said port of said coke drum for regulating the throughput of said port and for allowing repeated deheading and reheading of the coke drum said deheader valve comprising a main body having

an orifice dimensioned to a line with said port of said coke drum when said deheader valve is coupled thereto. A valve closure operably supported by said main body said valve closure capable of being actuated to oscillate between an open and closed position with respect to said orifice and said port and a means for supporting said valve closure a continuously maintained metal to metal contact seal between said valve closure and said means for supporting said valve closure and a means for actuating said valve closure.

Lu neither discloses nor suggests a main body with an orifice dimensioned to align with the port of said coke drum when the deheader valve is coupled thereto. Lu instead teaches a deheading frame which must be completely removed from the bottom flange of the coking drum for decoking to occur. Lu does not disclose or suggest a valve closure operably supported by the main valve said valve capable of being actuated to oscillate between opened and closed positions with respect to said orifice and said port in a means for actuating said valve closure. Lu further fails to disclose or suggest a continuously maintained metal to metal contact shield between the valve closure and said means for supporting said valve closure said contact seal sheering accumulated coke and effectively deheading said coke drum. Consequently, Lu does not anticipate nor render obvious independent claim 1 of the present invention. Because dependent claims 2-10 add further limitations to independent claim 1, Lu neither anticipates nor renders obvious claims 2-10.

Additional independent claims of the present inventions are distinguishable from the teaching of Lu. Independent claims 11, 17, 23, 29, 35, 41, 47 and 53 of the present application all contain elements not present nor suggested in the Lu. Each of the independent claims contain the following limitations:

[a] ... deheader valve comprising a main body removably coupled to a coke drum wherein said main body comprises an orifice dimensioned to a line with an opening of said coke drum ... a means for supporting said ... valve closure; and a metal to metal contact seal created between said valve closure and said means for supporting said ... valve closure said contact seal sheering any accumulated head

of coke upon actuation of said valve closure from a closed position to open position thus effectively deheading said coke drum.

Because the present invention claims a main body coupled to the coke drum wherein said main body comprises an orifice dimensioned to align with the opening of said coke drum the present invention claims an invention which allows for deheading of a coke drum without the steps of removing the main body and subsequently attaching a chute to the lower flange of the coke drum. Lu does not teach a method wherein the main body of the deheader valve remains attached to the bottom of a coke drum during the entire deheading process. Consequently, Lu does not anticipate nor render obvious any of the independent claims of the present invention. Because dependent claims 12-16, 18-22, 24-28, 30-34, 36-40, 42-46, 48-52 and 54-58 add further limitations to the present invention, Lu neither anticipates nor renders obvious said dependent claims.

*United States Patent No. 6,264,829 to Antalffy, et al.*

United States Patent No. 6,264,829, issued on July 24, 2002 to Antalffy, et al., (“Antalffy”) discloses a coke drum head which is hinged to a coke drum body using a compound joint such as a trammel pivot, and the head is moved between open and closed positions using an actuator. In moving between open and closed positions the head traces out a non circular path which reduces the required head room relative to a head using a standard pivot.

The claims of the present invention are distinguishable from the teachings of Antalffy. Independent claim 1 of the present application claims,

[a] coke drum deheader system comprising a coke drum having at least one port therein ... a deheader valve removably coupled to said port of said coke drum for regulating the throughput of said port and for allowing repeated deheading and reheading of the coke drum said deheader valve comprising a main body having an orifice dimensioned to align with said port of said coke drum when said deheader valve is coupled thereto. A valve closure operably supported by said main body said valve closure capable of being actuated to oscillate between an

open and closed position with respect to said orifice and said port and a means for supporting said valve closure a continuously maintained metal to metal contact seal between said valve closure and said means for supporting said valve closure and a means for actuating said valve closure.

Antalffy neither discloses nor suggests a main body with an orifice dimensioned to align with the port of said coke drum when the deheader valve is coupled thereto. Antalffy instead teaches a deheading frame which must be completely removed from the bottom flange of the coking drum for decoking to occur. Consequently, Antalffy does not anticipate nor render obvious independent claim 1 of the present invention. Because dependent claims 2-10 add further limitations to independent claim 1, Antalffy neither anticipates nor renders obvious claims 2-10.

Additional independent claims of the present inventions are distinguishable from the teaching of Antalffy. Independent claims 11, 17, 23, 29, 35, 41, 47 and 53 of the present application all contain elements not present nor suggested in the Antalffy. Each of the independent claims contain the following limitations:

[a] ... deheader valve comprising a main body removably coupled to a coke drum wherein said main body comprises an orifice dimensioned to a line with an opening of said coke drum ... a means for supporting said ... valve closure; and a metal to metal contact seal created between said valve closure and said means for supporting said ... valve closure said contact seal shearing any accumulated head of coke upon actuation of said valve closure from a closed position to open position thus effectively deheading said coke drum.

Because the present invention claims a main body coupled to the coke drum wherein said main body comprises an orifice dimensioned to align with the opening of said code drum, the present invention claims an invention which allows for deheading of a coke drum without the steps of removing the main body and subsequently attaching a chute to the lower flange of the coke drum. Antalffy does not disclose nor suggest a coke drum deheader system which has a deheader valve comprising a main body having an orifice dimensioned to align with said port said coke drum when said deheader valve is coupled thereto. Antalffy does not teach a method

wherein the main body of the deheader valve remains attached to the bottom of a coke drum during the entire deheading process. Consequently, Antalfy does not anticipate nor render obvious any of the independent claims of the present invention. Because dependent claims 12-16, 18-22, 24-28, 30-34, 36-40, 42-46, 48-52 and 54-58 add further limitations to the present invention, Antalfy neither anticipates nor renders obvious said dependent claims.

*United States Patent Application Publication No. 2002/0166862 to Malsbury et al.*

United States Patent Application Publication No. 2002/0166862 published November 14, 2002 to Malsbury ("Malsbury") discloses an unheading containment system for unheading and heading a pressure vessel which includes an unheading apparatus for removing a cover from a pressure vessel in an unheading operation in a modular enclosure mechanism to substantially enclose the cover during the unheading operation.

The claims of the present invention are distinguishable from the teachings of Malsbury. Independent claim 1 of the present application claims,

[a] coke drum deheader system comprising a coke drum having at least one port therein ... a deheader valve removably coupled to said port of said coke drum for regulating the throughput of said port and for allowing repeated deheading and reheading of the coke drum said deheader valve comprising a main body having an orifice dimensioned to a line with said port of said coke drum when said deheader valve is coupled thereto. A valve closure operably supported by said main body said valve closure capable of being actuated to oscillate between an open and closed position with respect to said orifice and said port and a means for supporting said valve closure a continuously maintained metal to metal contact seal between said valve closure and said means for supporting said valve closure and a means for actuating said valve closure.

Malsbury neither discloses nor suggests a main body with an orifice dimensioned to align with the port of said coke drum when the deheader valve is coupled thereto. Malsbury instead teaches a deheading frame which must be completely removed from the bottom flange of the coking drum for decoking to occur. Consequently, Malsbury does not anticipate nor render obvious

independent claim 1 of the present invention. Because dependent claims 2-10 add further limitations to independent claim 1, Malsbury neither anticipates nor renders obvious claims 2-10.

Additional independent claims of the present inventions are distinguishable from the teaching of Malsbury. Independent claims 11, 17, 23, 29, 35, 41, 47 and 53 of the present application all contain elements not present nor suggested in the Malsbury. Each of the independent claims contains the following limitations:

[a] ... deheader valve comprising a main body removably coupled to a coke drum wherein said main body comprises an orifice dimensioned to align with the opening of said coke drum ... a means for supporting said ... valve closure; and a metal to metal contact seal created between said valve closure and said means for supporting said ... valve closure said contact seal shearing any accumulated head of coke upon actuation of said valve closure from a closed position to open position thus effectively deheading said coke drum.

Because the present invention claims a main body coupled to the coke drum wherein said main body comprises an orifice dimensioned to align with the opening of said coke drum the present invention claims an invention which allows for deheading of a coke drum without the steps of removing the main body and subsequently attaching a chute to the lower flange of the coke drum. Malsbury does not teach a method wherein the main body of the deheader valve remains attached to the bottom of a coke drum during the entire deheading process. Consequently, Malsbury does not anticipate nor render obvious any of the independent claims of the present invention. Because dependent claims 12-16, 18-22, 24-28, 30-34, 36-40, 42-46, 48-52 and 54-58 add further limitations to the present invention, Malsbury neither anticipates nor renders obvious said dependent claims.

*United States Patent Application Publication No. 2003/0089589 to Malsbury et al.*

United States Patent Application Publication No. 2003/0089589 published May 15, 2003 to Malsbury ("Malsbury") discloses an apparatus including a coke drum for coking hydrocarbon



substances a valve disposed near the bottom of the coke drum, and a discharge conduit for removing coke from the coke drum, wherein the discharge conduit is connected to the valve such that when the valve is open, the coke may be removed by the discharged conduit.

The claims of the present invention are distinguishable from the teachings of Malsbury.

Independent claim 1 of the present application claims,

[a] coke drum deheader system comprising a coke drum having at least one port therein ... a deheader valve removably coupled to said port of said coke drum for regulating the throughput of said port and for allowing repeated deheading and reheading of the coke drum said deheader valve comprising a main body having an orifice dimensioned to a line with said port of said coke drum when said deheader valve is coupled thereto. A valve closure operably supported by said main body said valve closure capable of being actuated to oscillate between an open and closed position with respect to said orifice and said port and a means for supporting said valve closure a continuously maintained metal to metal contact seal between said valve closure and said means for supporting said valve closure and a means for actuating said valve closure.

Malsbury neither discloses nor suggests a main body with an orifice dimensioned to align with the port of said coke drum when the deheader valve is coupled thereto. Malsbury instead teaches a deheading frame which must be completely removed from the bottom flange of the coking drum for decoking to occur. Malsbury neither discloses nor suggests a coke drum deheading system comprising a deheading valve removably coupled to the port of the coke drum for regulating a throughput of said port allowing for repeated deheading and reheading of a coke drum when said deheading valve comprises a main body having an orifice dimensioned to align with the port of said coke drum; a valve closure operably supported by said main body said valve closure being capable of being actuated to oscillate between an open and closed position with respect to said orifice and said port ; a means for support said valve closure; a continuously maintained metal to metal contact seal between said valve closure and said means for supporting said valve closure said contact seal sheering accumulated coke and effectively deheading said

coke drum upon actuation of said valve closure. Consequently, Malsbury does not anticipate nor render obvious independent claim 1 of the present invention. Because dependent claims 2-10 add further limitations to independent claim 1, Malsbury neither anticipates nor renders obvious claims 2-10.

Additional independent claims of the present inventions are distinguishable from the teaching of Malsbury. Independent claims 11, 17, 23, 29, 35, 41, 47 and 53 of the present application all contain elements not present nor suggested in the Malsbury. Each of the independent claims contains the following limitations:

[a] ... deheader valve comprising a main body removably coupled to a coke drum wherein said main body comprises an orifice dimensioned to a line with an opening of said coke drum ... a means for supporting said ... valve closure; and a metal to metal contact seal created between said valve closure and said means for supporting said ... valve closure said contact seal shearing any accumulated head of coke upon actuation of said valve closure from a closed position to open position thus effectively deheading said coke drum.

Because the present invention claims a main body coupled to the coke drum wherein said main body comprises an orifice dimensioned to align with the opening of said coke drum the present invention claims an invention which allows for deheading of a coke drum without the steps of removing the main body and subsequently attaching a chute to the lower flange of the coke drum. Malsbury does not teach a method wherein the main body of the deheader valve remains attached to the bottom of a coke drum during the entire deheading process. Consequently, Malsbury does not anticipate nor render obvious any of the independent claims of the present invention. Because dependent claims 12-16, 18-22, 24-28, 30-34, 36-40, 42-46, 48-52 and 54-58 add further limitations to the present invention, Malsbury neither anticipates nor renders obvious said dependent claims.

Summary and Conclusion

In light of the foregoing, Applicants respectfully submit that the claims of the present invention contain limitations that are neither disclosed nor rendered obvious by the relevant references discovered in the pre-examination search. The unique combination of features or elements presented in the present invention are not found in any of the prior art references. Applicants therefore respectfully submit that the present invention is patentable over the prior art references.

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Respectfully submitted,



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